Motion Imagery Standards Board **Engineering Guideline** **Cursor on Target (CoT) Conversions for Key-Length-Value (KLV) Metadata**	**MISB EG 0805** **18 September 2008**

1 Scope

This Engineering Guideline (EG) defines the Motion Imagery Standards Board (MISB) metadata items used for fields in Cursor on Target (CoT) Situational Awareness (SI) messages. Two CoT message conversions from MISB-standard Key Length Value (KLV) metadata sets are described in this document – Platform Position and Sensor Point of Interest (SPI).

Conversions from both MISB EG 0601.1 UAS Datalink Local Data Set and MISB EG 0104.5 Predator Universal Metadata Set are included here. The intent of this standard is to provide a method of generating CoT messages either in real time or at a later date from motion imagery files and the results should be the same in either case. While other MISB standards encourage the use of UUIDs, a UUID generated after the fact would differ from one created at the same time as the motion imagery stream and are therefore not recommended in this document.

Only a listing of the KLV items used in the CoT fields are presented here. CoT fields not having an equivalent KLV representation have a value defined here to complete the CoT messages. More details on the formatting of CoT XML messages can be obtained from http://cot.mitre.org and the DISR.

2 Introduction

Cursor on Target (CoT) is a communication method for Department of Defense (DoD) systems to pass time sensitive position data. The CoT messages provide a description of an object (what), the time an event occurs (when), and the position of an event (where).

3 References

Cursor on Target for the UAV Domain v. 4, 2006.
*DoD Information Technology Standards and Profile Registry (*https://disronline.disa.mil)
MIL-STD 2525 Common Warfighter Symbology
MISP 4.5 - Motion Imagery Standards Profile version 4.5, dated 15 May 2008
MISB EG 0104.5 Predator UAV Universal Metadata Set, dated 14 December 2006
MISB EG 0601.1 UAS Datalink Local Metadata Set, dated 15 May 2008
The Developer's Guide to Cursor on Target, August 2005.

4 KLV to CoT Translation

Cursor on Target (CoT) is a simple messaging format for situational awareness and command-and-control functions. In order to facilitate future interoperability, recommended conversions from EG 0104 and EG 0601 KLV metadata tags to two basic CoT schema messages (Platform Position and Sensor Point-of-Interest (SPOI)) are presented in this document.

CoT attempts to create an object hierarchy consistent with Object Oriented Programming (OOP). In large part, the object hierarchy is consistent with MIL STD 2525. Currently, CoT is implemented only in XML, although future versions of CoT might use other instantiations. CoT does take some liberties with "normal" and/or "best practice" XML coding with respect to objects and inheritance to achieve its OOP goals. *The Developer's Guide to Cursor on Target* goes into the motivation and limitations of the XML implementation in some detail.

Table 1

Platform Position Message in Cursor on Target (CoT) Schema For Converting MISB KLV to CoT			
CoT Key	**EG 0601.1 LDS Tag # and Name or Notes**	**EG 0104 UDS Key # and Name or Notes**	**Notes**
point/lat	13 Sensor Latitude	**Device Latitude** **06 0E 2B 34 01 01 01 03 07 01 02 01 02 04 02 00**	CoT requires WGS-84 decimal degrees with North positive
point/lon	14 Sensor Longitude	**Device Longitude** **06 0E 2B 34 01 01 01 03 07 01 02 01 02 06 02 00**	CoT requires WGS-84 decimal degrees with East positive
point/hae	15 Sensor True Altitude	**Device Altitude** **06 0E 2B 34 01 01 01 03 07 01 02 01 02 02 00 00**	The KLV key is altitude; it must be converted to Ellipsoid Height; given in meters
point/ce	9999999		This represents "no value given"
point/le	9999999		This represents "no value given"
version	2.0		CoT Version Number
type	a-f-A-M-F (as an example)		Atom-friendly-Air AOB- Military-Fixed Wing (Reference CoT definitions in Event.xsd v 1.4 2007/02/27 for other "types" as applicable to other platforms)
uid	10 Device Designation 3 Mission ID	**Device Designation** **06 0E 2B 34 01 01 01 01 01 01 20 01 00 00 00 00** **Episode Number** **06 0E 2B 34 01 01 01 01 01 05 05 00 00 00 00 00**	For EG 0104.5 implementations, Concatenate Device Designation and Episode Number with the two values separated by an underscore ("_") character; for 0601.1 implementations, concatenate Tags 10 and 3 separated by an underscore ("_") character.
time	2 UNIX Time Stamp	**User Defined Time Stamp** **06 0E 2B 34 01 01 01 03 07 02 01 01 01 05 00 00**	Convert to ISO 8601 YYYY-MM-DDThh:mm:ss.ssZ (Fractional seconds are optional and number of decimal places unbounded); this is the time the message is generated
start	2 UNIX Time Stamp	**User Defined Time Stamp** **06 0E 2B 34 01 01 01 03 07 02 01 01 01 05 00 00**	Convert to ISO 8601 YYYY-MM-DDThh:mm:ss.ssZ (Fractional seconds are optional and number of decimal places unbounded); this is the time the message becomes valid (should be the same as Time)
stale	Time of next CoT platform position message		This is the time at which the position message is no longer valid; use ISO 8601
how	m-p		How the position was obtained (machine-passed). Reference CoT definitions in Event.xsd v 1.4 2007/02/27 for further explanation and other possible values.
detail/_flow-tags_	Current Time		Indicates that system "touched" the event and at what time. Format as EG0601.1CoT or EG0104.5CoT = 'YYYY-MM-DDThh:mm:ss.ssZ' with the current time.
sensor/azimuth	5 Platform Heading Angle 18 Sensor Relative Azimuth Angle	**Angle to North** **06 0E 2B 34 01 01 01 01 07 01 10 01 02 00 00 00**	Sensor absolute azimuth obtained by adding platform heading angle and sensor relative azimuth angles together; CoT requires decimal degrees
sensor/fov	16 Sensor Horizontal Field of View	**Field of View (Horizontal)** **06 0E 2B 34 01 01 01 02 04 20 02 01 01 08 00 00**	Sensor Horizontal Field of View; CoT requires decimal degrees

sensor/vfov	17 Sensor Vertical Field of View	**Field of View (Vertical)** **06 0E 2B 34 01 01 01 07 04 20 02 01 01 0A 01 00**	Sensor Vertical Field of View; CoT requires decimal degrees
sensor/model	11 Image Source Sensor	**Image Source Device** **06 0E 2B 34 01 01 01 01 04 20 01 02 01 01 00 00**	Image Source Device
sensor/range	21 Slant Range	**Slant Rnage** **06 0E 2B 34 01 01 01 01 07 01 08 01 01 00 00 00**	CoT requires this be in meters

Table 2

Sensor Point of Interest (SPI) in Cursor on Target (CoT) Schema For Converting MISB KLV to CoT			
CoT Key	**EG 0601.1 LDS Tag # and Name or Notes**	**EG 0104 UDS Key # and Name or Notes**	**Notes**
point/lat	23 Frame Center Latitude 40 Target Location Latitude (if available)	**Frame Center Latitude** **06 0E 2B 34 01 01 01 01 07 01 02 01 03 02 00 00**	EG 0601 uses WGS84, so no co-ordinate system transformation necessary; Integer to decimal degrees mapping necessary.
point/lon	24 Frame Center Longitude 41 Target Location Longitude (if available)	**Frame Center Longitude** **06 0E 2B 34 01 01 01 01 07 01 02 01 03 04 00 00**	EG 0601 uses WGS84, so no co-ordinate system transformation necessary; Integer to decimal degrees mapping necessary.
point/hae	25 Frame Center Elevation 42 Target Location Elevation (if available)	**Frame Center Elevation** **06 0E 2B 34 01 01 01 0A 07 01 02 01 03 16 00 00**	MSL to HAE transformation required here; both use meters
point/ce	45 Target Error Estimate – CE90	9999999	Conversion from 2.146 σ (CE90) to 1 σ (CoT standard) necessary; Point/CE also includes target size. If key is not available, replace with 9999999.
point/le	46 Target Error Estimate – LE90	9999999	Conversion from 1.645 σ (LE90) to 1 σ (CoT standard) necessary; Point/CE also includes target height. If key is not available, replace with 9999999.
version	2.0		CoT Version Number
type	b-m-p-s-p-i		Bits-mapping-point-sensor-point-interest (Note that this will not change, unlike platform type)
uid	10 Device Designation 3 Mission ID 11 Image Source Sensor	**Device Designation** **06 0E 2B 34 01 01 01 01 01 01 20 01 00 00 00 00** **Episode Number** **06 0E 2B 34 01 01 01 01 01 05 05 00 00 00 00 00** **Image Source Device** **06 0E 2B 34 01 01 01 01 04 20 01 02 01 01 00 00**	For EG 0104.5 implementations, Concatenate Device Designation, Episode Number, and Image Source Device separated by an underscore ("_") character before and after the Episode Number. For EG 0601 implementations, concatenate Tags 10, 3, and 11 with an underscore character ("_") before and after Tag 3.
time	2 UNIX Time Stamp	**User Defined Time Stamp** **06 0E 2B 34 01 01 01 03 07 02 01 01 01 05 00 00**	Convert to ISO 8601 YYYY-MM-DDThh:mm:ss.ssZ (Fractional seconds are optional and number of decimal places unbounded); this is the time the message is generated

start	2 UNIX Time Stamp	**User Defined Time Stamp** **06 0E 2B 34 01 01 01 03 07 02 01 01 01 05 00 00**	Convert to ISO 8601 YYYY-MM-DDThh:mm:ss.ssZ (Fractional seconds are optional and number of decimal places unbounded); this is the time the SPOI message becomes valid (should be the same as Time)
stale	Time of next CoT SPOI message		This is the time at which the position message is no longer valid; use ISO 8601
how	m-p		How the position was obtained (machine-passed). Reference CoT definitions in Event.xsd v 1.4 2007/02/27 for further explanation and other possible values.
detail/_flow-tags_	Current Time		Indicates that system "touched" the event and at what time. Format as EG0601.1CoT or EG0104.5CoT = 'YYYY-MM-DDThh:mm:ss.ssZ' with the current time.
detail/link/relation	p-p		p-p (parent producer)
detail/link/type	a-f-A-M-F (as an example)		Type of the event this message is linked to. (Reference CoT definitions for other "types" as applicable to other platforms)
detail/link/uid	UID of the Platform that the SPOI is linked to		Specific UID of parent event.

Glossary of Acronyms

CoT	Cursor-on-Target
EG	Engineering Guideline
FPS	Frames per Second
GPS	Global Positioning Satellite
KLV	Key-Length-Value
MI	Motion Imagery
MISP	Motion Imagery Standards Profile
RP	Recommended Practice
SMPTE	Society of Motion Picture and Television Engineers
UTC	Coordinated Universal Time (“Zulu Time”)
UUID	Universally Unique Identifier
XML	Extensible Markup Language